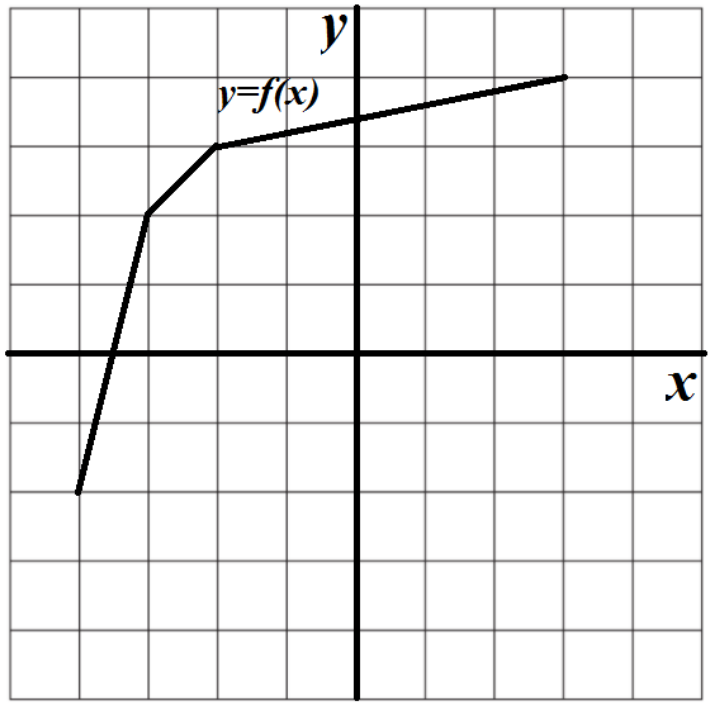
EXAM 2 - MATH 111 Friday, March 4

YOUR NAME:_____ George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. (a) The graph of the function $y = f(x)$ is shown below. Sketch, on the same system of coordinate axes the graph of $y = f^{-1}(x)$.



(b) Find a formula for $f^{-1}(x)$ if $f(x) = \dfrac{2x-7}{3-5x}$.

2. (a) Write an equation for the line that passes through the points $(-15, 20)$ and $(7, -46)$.

(b) A straight line ℓ has equation $5x + 20y = 3$ (in the general form).

(i) Write an equation for ℓ in the slope-intercept form.

(ii) Write an equation for the line that is perpendicular to ℓ and passes through the point $(-1, 10)$.

3. An auto-parts business started operations in 2010. Its available investment capital grew linearly from \$480,000 in 2015 to \$700,000 in 2020.

   (a) Find an equation for the capital $C(t)$ as a function of the time t in years since 2010 (when the company was established).

   (b) Predict when the company's investment capital will exceed \$1.5 million.

4. (a) Locate by hand the vertex of the parabola $f(x) = -3x^2 + 18x - 20$.

(b) Write an equation in standard form for the parabola of Part (a).

5. Consider the function $f(x) = x^4 - 2x^3 - 15x^2$. Answer all questions by hand.

(a) The degree of $f(x)$ is

(b) The leading term of $f(x)$ is

(c) Give the end-behavior of $y = f(x)$ **using formal notation**.

(d) The y-intercept is

(e) Find the x-intercepts by hand.

(f) The function $y = f(x)$ has at most how many turning points?